

# MARINE INVASIVE SPECIES GUIDE

An Interpretive Guide for  
Identifying and Reporting  
Marine Invasive Species  
on Haida Gwaii



Produced in partnership by the Marine Plan Partnership (Council of the Haida Nation and Province of British Columbia), Fisheries and Oceans Canada (DFO), and Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site (CHN, DFO and Parks Canada)



MaPP



HAIDA NATION



BRITISH  
COLUMBIA

Canada 

# MARINE INVASIVE SPECIES

## Background

Invasive Species can have huge impacts on marine ecosystems and are one of the greatest threats to the world's oceans. They pose significant ecological, cultural and economic risks. To date, major impacts of invasive species include problems for commercial mussel farms on the Atlantic Coast and destruction of eelgrass beds on the Pacific Coast.

This guide will help people to identify marine invasive species on Haida Gwaii. Everyone can do their part to slow and stop their spread by knowing which species are **invasive** and following best practises. The invasive species highlighted should not be confused with **native** sponges, tunicates, and crabs.

The Haida value of '**laa guu ga kahlhlns** *responsibility* to care for the sea and land is one of the principles guiding monitoring and management of invasive species on Haida Gwaii. Knowing that **gina** '**waadluxan gud ad kwaagiida** *everything depends on everything else* highlights the importance of controlling invasive species to prevent imbalance in marine ecosystems of Haida Gwaii.

## Species of concern for Haida Gwaii

On Haida Gwaii, the invasive species of concern are the European Green Crab and the tunicates: Sea Vomit, Diplosoma, Chain Tunicate and Star Tunicate.

# INVASIVE TUNICATES

## What is a tunicate?

A tunicate is a filter-feeding invertebrate that draws water in through one siphon, filters food from the water, and expels the filtered water and waste out a different siphon. Tunicates can be solitary or colonial. Colonial tunicates consist of many individuals, called zooids, embedded in a common gelatinous membrane or tunic. Colonial tunicates can regrow from small fragments of the colony and are currently of greatest concern for Haida Gwaii.



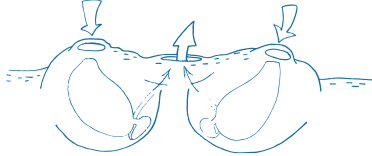
Take pictures and report anything suspicious that you encounter on boats or gear to: [invasives@haidanation.com](mailto:invasives@haidanation.com)

# INVASIVE TUNICATES

*Figure 1: Solitary Tunicate*



*Figure 2: Colonial Tunicate*



Illustrations: Anya Dunham

**Where They Grow** The invasive tunicates of concern for Haida Gwaii are colonial tunicates that live in marine subtidal waters and can grow on any hard surface, including other organisms, boats, gear, docks, rocky shores and gravel. They can form 'blankets' that smother large areas and the attached native animals. They live in polluted areas or estuaries.

**How They Spread** Colonial tunicates can spread either via reproduction or fragmentation. When water temperatures are warm enough for long enough, they can spawn and produce larvae which remain free-living in the water for a day or less before settling on a hard surface. They can also grow and spread from small fragments of a disturbed adult colony.

**What You Can Do** Check your vessels and gear for invasive colonial tunicates. Manually remove any you find and dispose of them on land. If you pressure wash colonial tunicates off equipment or vessels, only do so on land and make sure the water and materials do not flow back into the ocean! Fragments that re-enter the ocean can regrow into new colonies and spread colonial tunicates further. If possible, completely dry vessels and gear before placing them back in the ocean or moving them between sites. Drying for a minimum of three days kills most species of concern, and drying for longer is better.

## Invasive Sea Vomit

*Didemnum vexillum*



Photo: Anya Dunham

*Diplosoma listerianum*



Photo: Bernard Hanby

*Didemnum* and *Diplosoma* are both invasive and can look very similar – although *Diplosoma* tends to form thinner mats and have less of an impact than *Didemnum*. Please report either species.

## How to Identify Sea Vomit

- Colonial tunicate
- Colour ranges from light tan to orange
- Dark lines may run between groupings of zooids
- Large colonies form long slender lobes
- May have a 'spotted' appearance

Dark lines between groupings of zooids



Photo: Anya Dunham

- Press on the tunicate to check for a tough gelatinous texture (local sponges, have a soft and spongy texture)

**Range** Sea Vomit is originally from Japan, it has invaded southern B.C. but has not reached Haida Gwaii as of 2020.

*Diplosoma listerianum*'s origin is unknown, but not native to the Pacific Northwest. It has invaded several locations in Haida Gwaii, including the docks in **Daajing Giids Queen Charlotte**.

## Variation in Appearance

Both of these colonial tunicates can have a wide range of different colours and textures that can make identification more challenging. These photos provide some examples. Please report either species, even if not clearly identified.

### Invasive Sea Vomit

*Didemnum vexillum*



Photo: Bernard Hanby



Photo: Bernard Hanby



Photo: Anya Dunham

*Diplosoma listerianum*



Photo: Bernard Hanby

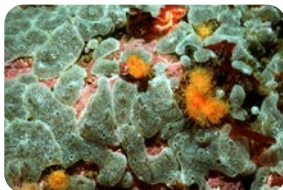


Photo: RBCM



Photo: RBCM

Sea Vomit

## Invasive Chain Tunicate

*Botrylloides violaceus*



Photo: Matthias Herborg

### How to Identify

- Colonial tunicate
- Colony usually one solid colour (orange, yellow, red, pink, white, tan, or purple)
- Zooids upright (vertical to substrate)
- Usually organized into elongated, wavy rows

**Figure 3: Chain Tunicate formation**

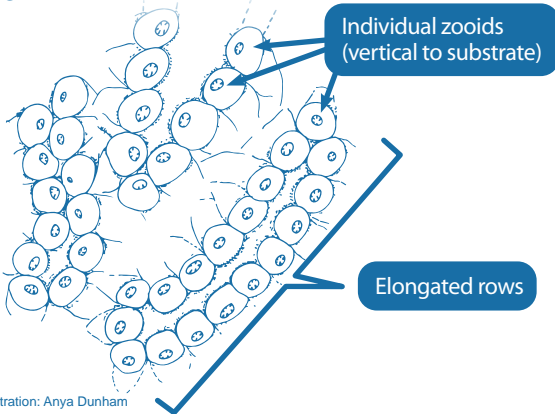


Illustration: Anya Dunham

**Range** Originally from Japan. It has invaded several locations in Haida Gwaii, including the docks in **Daajing Giids** Queen Charlotte, Masset, and **Gamadiis** Port Clements.

## Variation in Appearance

Chain tunicates can appear in many different colours, including yellow, orange, beige, and pink.

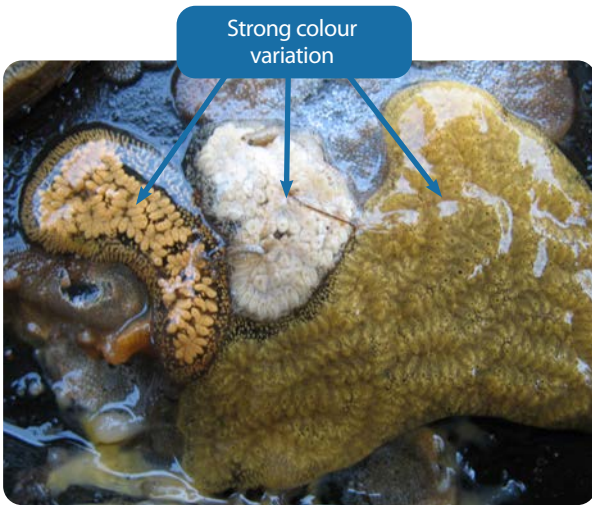


Photo: Lucy Hannah



Photo: Vanessa Hodes

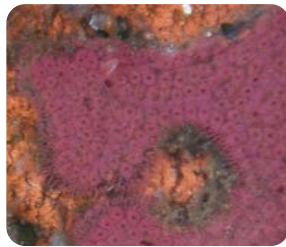


Photo: Stuart Crawford



Photo: Stuart Crawford

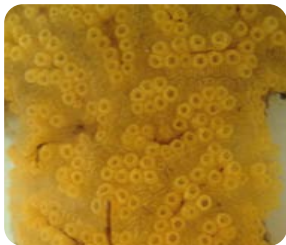


Photo: Anya Dunham

**Chain Tunicate**



## Invasive Star Tunicate

*Botryllus schlosseri*



Photo: Lucie Hannah



Photo: Jocelyn Nelson

### How to Identify

- Colonial tunicate
- Colony usually two-toned but can appear as one colour (orange, white, black, brown, or green)
- Organized into star or flower shaped patterns
- Zooids are horizontal to the substrate (recumbent) with the pointy-end of zooid directed inward towards the center of the cluster

**Figure 4: Star Tunicate formation**

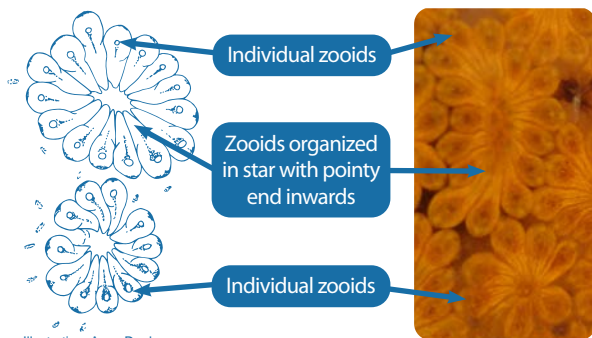


Illustration: Anya Dunham

**Range** Originally from Europe (Mediterranean). It has invaded several locations in Haida Gwaii, including the docks in **Daajing Giids Queen Charlotte**, **Masset**, and **Gamadiis Port Clements**.



## Variation in Appearance

Star tunicates can appear in many different colours, including yellow, orange, beige, and grey.

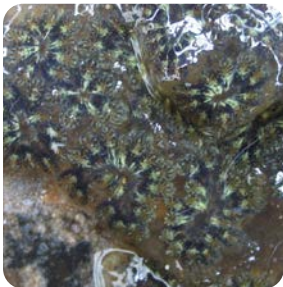


Photo: Matthias Herborg



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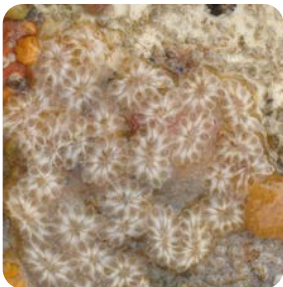


Photo: Heidi Gartner



Photo: Heidi Gartner

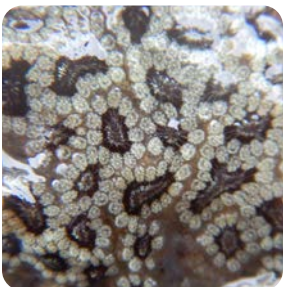


Photo: Jocelyn Nelson



# Star Tunicate

## Native species that can be confused with the invasive tunicates

To differentiate invasive tunicates from these native species on Haida Gwaii, compare the pictures below and take care not to harm native species.

**Native sponges** also come in many colours, but have a soft and spongy texture instead of the gelatinous texture of tunicates.



Photo: Anya Dunham

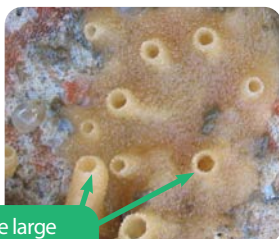


Photo: Matthias Herborg

Notice the large osculum, an opening for water exchange



Photo: Ariel Bauman-Simpson



Photo: <http://adamschneider.net/photos/>

Some **native tunicates** can be confused with invasive tunicates.

### *Eudistoma psammion*

#### How to Identify

- Colonies form thick, leathery slabs that are encrusted with sand. Colour ranges from brown to red to purple-grey.
- Zooids are arranged in irregular shapes.

**Range** British Columbia to southern California.



Photo: Bernard Hanby

## *Aplidium solidum*

### How to Identify

- Colonies form fleshy slabs that are up to 3 cm thick.
- Zooids are red to orange, and arranged in irregular shapes within a paler (usually pinkish) tunic.

**Range** British Columbia to southern California.



Photo: RBCM



Photo: RBCM



Photo: Bernard Hanby

## *Distaplia occidentalis*

### How to Identify

- Zooids are arranged in circles and range in colour from pale orange to purple, grey, yellow, or cream.
- Older colonies have a short stalk, like a squashed cauliflower.

**Range** Southern Alaska to southern California.

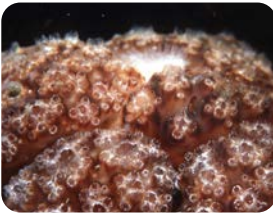


Photo: RBCM



Photo: Stuart Crawford

## *Cystodytes lobatus*

### How to Identify

- Colonies form fleshy slabs that are up to 5 cm thick.
- Zooids are not visible through the surface of the colony, but it has a speckled appearance.
- Colour ranges from white to pale pink, purple, orange, or grey.

**Range** British Columbia to Baja California.



Photo: RBCM

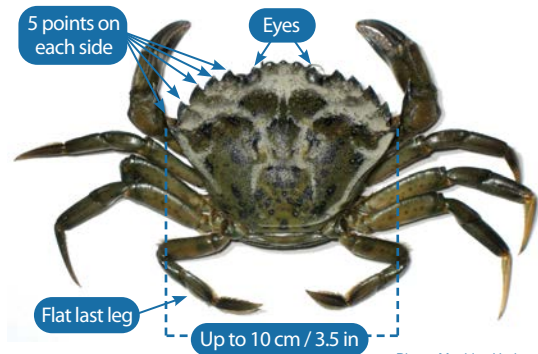


Photo: Bernard Hanby

# Native Tunicates & Sponges

## Invasive European Green Crab

*Carcinus maenas*



European Green Crabs compete with native crab species and are a major predator on clams, mussels, juvenile fishes, and other species in the natural environment. These crabs are also known to destroy eelgrass meadows.

### How to Identify

- Despite the crab's name, colour is variable, especially in juveniles. Carapace (back) is mottled green. Underside can be orange, light green or even off-white.
- Shell up to 10 cm (3.5 inches) wide.
- Five distinct points lateral to each eye.
- Three rounded lobes between the eyes.
- Little to no hair on shell and claws, and only very little along the edge of the walking legs.

**Range** Originally from Europe. Has invaded much of the west coast of North America, and was first detected in Haida Gwaii in 2020.

**What You Can DO** Take special care to thoroughly look at and rinse harvested shellfish before leaving the harvest area. Please don't confuse the European Green Crab with native crab species.



Take pictures and report potential European Green Crab sightings to:  
**[invasives@haidanation.com](mailto:invasives@haidanation.com)**

## Native crab species that can be confused with the European Green Crab

The following native crab species are common on Haida Gwaii and could be confused with the invasive European Green Crab, especially in juvenile stages. Please take care not to harm these native crab species.

### Helmet Crab

(*Telmessus cheiragonus*)

- Six unequal, jagged points on each side of shell.
- Shell and legs covered with stiff bristly hair.
- Body yellowish green with darkened claw tips.
- Shell width up to 10 cm (4 in) across.



Photo: RBCM

### Shore Crab

(*Hemigrapsus nudus* and *Hemigrapsus oregonensis*)

- Three indistinct points on each side of shell.
- Claws and shell rounded.
- Variable colour: Purple, red, yellow, green, brown, white.
- Shell width up to 5 cm (2 in) across.



*H. nudus*

Photo: Gustav Paulay | University of Florida



*H. oregonensis*

Photo: Kelly Martin | Washington Sea Grant

### Dungeness Crab

(*Cancer magister*)

- Ten points on each side of shell.
- Five small, unequal teeth between the eyes.
- Light-coloured leg and claw tips.
- Shell width up to 23 cm (9 inches) across.



Photo: Matthias Herborg

### Red Rock Crab

(*Cancer productus*)

- Ten points on each side of shell.
- Claws dark at the tips.
- Reddish color.
- Shell width up to 18 cm (7 in) across.



Photo: Matthias Herborg

### Graceful Crab

(*Cancer gracilis*)

- Ten points on each side of shell.
- All legs are very pointed and without hairs.
- Brown to purple.
- Shell width up to 12 cm (5 in) across.



Photo: Matthias Herborg

# European Green Crab

cm



## You Can Help Prevent the Spread of Invasive Species



Everyone on the water can help control the spread of invasive species by taking a few simple actions.



### CHECK YOUR BOAT

- **INSPECT** your boat and gear for invasive species often, while in use and whenever it is out of the water.
- **REPORT** anything suspicious!



### CLEAN YOUR BOAT

- **CLEAN** your boat over a tarp on land once a season or whenever it is out of the water.
- **REMOVE** anything suspicious from the hull, motor, and other places that sit in the water.
- **COLLECT AND DISPOSE** of anything cleaned off your boat on land to prevent spread.



### DRAIN, DRY, PAINT YOUR BOAT

- **DRAIN AND DRY** your boat and gear for at least three days to kill invasive species, and longer is better.
- **PAINT** your hull regularly, ideally once a year or whenever it is out of the water.

### SEE SOMETHING? SAY SOMETHING!

1. Take clear photos of the suspect
2. Record date and location with GPS if possible
3. If it's on your boat, report where it has been recently
4. Report this information to:



[invasives@haidanation.com](mailto:invasives@haidanation.com)

Your information will help all management partners track and reduce the spread of these invaders!

### Haawa - Haw'aa - Thank You for

*Photos, hand drawings, text, advice, and graphic design:*

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